CLINICAL PROFILE AND IN-HOSPITAL MORBIDITY / MORTALITY OF ACUTE STEMI IN ELDERLY POPULATION

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CERTIFICATE

This is to certify that the dissertation titled **"CLINICAL PROFILE AND IN-HOSPITAL MORBIDITY / MORTALITY OF ACUTE STEMI IN ELDERLY POPULATION"** is the bonafide original work of **Dr. G.KANNAN** in partial fulfillment of the requirements for M.D. Branch – I (General Medicine) Examination of the Tamilnadu DR. M.G.R Medical University to be held in MARCH 2010. The Period of study was from June 2009 to November 2009.

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DECLARATION

I, **Dr.G.KANNAN,** solemnly declare that dissertation titled **"CLINICAL PROFILE AND IN-HOSPITAL MORBIDITY / MORTALITY OF ACUTE STEMI IN ELDERLY POPULATION"** is a bonafide work done by me at Government Stanley Medical College and Hospital, Chennai, during June 2009 to November 2009 under the guidance of **Prof. V.Ruckmani Reddy, M.D.,** Professor of Medicine, Government Stanley Medical College and Hospital, Chennai.

This dissertation is submitted to Tamilnadu Dr. M.G.R Medical University, towards partial fulfillment of requirement for the award of **M.D. Degree (Branch – I) in General Medicine – March 2010.**

Place : Chennai **(Dr. G.KANNAN)**

Date :

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CONTENTS

INTRODUCTION

Myocardial infarction is the term used when the myocardium is necrosed due to ischemia. It may be transmural or subendocardial.

Patients with ischaemic heart disease fall into two large groups. Patients with stable angina and patients with acute coronary syndromes (ACS). ACS group in turn is composed of patients with acute myocardial infarction with ST elevation (STEMI), those with unstable angina (UA) and non ST segment elevation MI (NSTEMI).

STEMI in elderly deserves special attention. The highest risk group of patients with acute STEMI are clearly the elderly. Cardiovascular death is the leading cause of death in elderly.

Presentation of acute MI in elderly differs. Even though the chest pain is the most common symptom reported, they tend to present more often with dyspnoea, diaphoresis, dizziness and syncope. They tend to present to the hospital a little later.

Elderly tend to have more severe CAD and exhibit more complications and death. It is recommended that the reperfusion therapy should be used more aggressively. Management is often challenging because of the co-morbidities.

AIM OF THE STUDY

To study the clinical profile of 60 cases of STEMI in elderly (Age 65 and above) and to analyse age and sex distribution, symptomatology, clinical features, complications and outcome.

REVIEW OF LITERATURE

INTRODUCTION

The diagnosis and management of ischemic heart disease in the elderly is an increasingly frequent challenge. The elderly constitute the most rapidly growing segment of our society. They represent a much larger proportion of patients with cardiac disease being treated in a hospital or in a physician's office.

In the elderly, ischemic disease itself is responsible for over one-half of the deaths and the vast majority of patients with congestive heart failure and cardiac disability.

PHYSIOLOGICAL CHANGES ASSOCIATED WITH CARDIAC AGING

Age-related changes in cardiac function and structure are well described in normal man, and the mechanisms responsible for these are explored in animal models of aging.

The most important of these are prolonged contraction and relaxation and a diminished response to ß-adrenergic sympathetic stimulation.

Prolonged relaxation is evidenced by a decrease in the slope of early mitral valve closure on M-mode echocardiography, a decrease in peak filling rate and an increase in the time to peak filling rate on radionuclide angiography studies, and an increase in Doppler indices of atrial contribution to left ventricular filling.

Prolonged contraction and delayed relaxation properties may also be related to changes in physical conditioning status and endocrine function, as exercise protocols and administration of thyroid hormone reverse some of these age-related changes.

In addition to changes in relaxation parameters, both animals and human data indicate that aging decreases cardiovascular ß-adrenergic responsiveness. This is true for the inotropic, chronotropic, as well as the vasodilating effects of these agents. Diminished ß-adrenergic responsiveness results in a decreased dependence on sympathetic-mediated increases in heart rate and contractility during exercise stress, and a greater dependence on an increase in stroke volume mediated via an increase in end-diastolic volume-the frank-starling effect.

These changes may alter presenting symptoms in patients with ischemic disease. Ischemia, similar to aging, alters diastolic properties so as to increase end diastolic pressure for any given volume. Older individuals may therefore be more likely than younger patients to experience dyspnoeic symptoms for any given ischemic or tachycardic insult. Decreased dependence on sympathetic-induced cardiovascular changes to mediate an exercise response suggests that ß-adrenergic blockers may be less effective anti-ischemic agents during exercise in older population.

RISK FACTORS

The risk factors in elderly include

- hypertension (specially isolated systolic hypertension)
- diabetes
- smoking
- hyperlipidemia
- physical inactivity
- others (obesity...)

IMPORTANCE OF RISK FACTORS

Although the significance of risk factors for the development of coronary disease is well recognized in the younger and middle-aged groups, the importance of risk factor management in the elderly is sometimes debated.

HYPERTENSION

Epidemiological data indicate that systolic blood pressure is an important discriminator of cardiovascular risk for middle-aged and older men and women. In addition, several studies indicate that treating diastolic hypertension in individuals in to the eighth decade of life reduces all cause mortality as well as cardiac and stroke mortality and morbidity.

In the Systolic Hypertension in Elderly program trial, treatment of isolated systolic hypertension(systolic, 160 mmhg or more) in those 60 yrs of age or more resulted in a 36% decrease in fatal and nonfatal stroke, a 27% decrease in nonfatal myocardial infarction or coronary death and a 32% reduction in all major cardiovascular events.

The goals of antihypertensive therapy encompass lowering overall cardiovascular risk as well as decreasing the blood pressure.

Since antihypertensive therapy impact on other cardiovascular risk factors, as well as concomitant diseases that older individuals are more likely to have, the influence of agents on these variables should also be considered. Thus, potassium-sparing diuretics may have favourable effect on electrolyte balance; ß-blockers and calcium blockers have anti-ischemic effects; ß-blockers provide secondary prevention post infarction; and ACE inhibitors slow the progression of renal disease in diabetic hypertensive patients, and improve outcomes in post infarction patients with left ventricular dysfunction. Finally, it is recognized that left ventricular hypertrophy is an independent risk factor for the development of coronary disease in elderly men and women.

The diagnosis and appropriate treatment of hypertension is an important goal in the prevention of coronary outcomes in older patients.

SMOKING

Another important remedial risk factor in the elderly is cigarette use. The effects of smoking cessation were evaluated in a subset of participants in the CASS registry. The relative risk of myocardial infarction or death over a 6-yr period for those who continued to smoke, as compared to those who stopped, was 2.9(1.4,5.9)for those men and women 70 yrs of age and older and 1.5(1.0,2.3)for those aged 65-69 yrs. These were similar to or greater than the benefit in those under 65 yrs of age.

Thus, there is strong suggestive evidence that even our older patients can reduce cardiac risk when they stop smoking.

HYPERLIPIDEMIA

A common risk factor in older individuals is elevated lipids. Although earlier data were conflicting, recent information indicates that lipids-in particular, the HDL level is related to coronary mortality in older individuals.

In the Established Populations for Epidemiological Studies of the Elderly report, there was a 17% increase in the risk for coronary heart disease, death for every 1U increase in the total cholesterol/HDL cholesterol ratio in nearly 5000 men and women aged 71 yrs or older.HDL cholesterol was also related to coronary outcomes in women and in those over 80 yrs of age. Although there are no data concerning the value of lipid lowering therapy for primary prevention in older population, there are data regarding its effectiveness in older individuals with known coronary disease.

In the Scandinavian study, HMG COA reductase inhibitor therapy was associated with a 0.73 relative risk of all cause mortality and a 0.71 relative risk of a major coronary event, defined as coronary death, nonfatal myocardial infarction, or cardiac arrest in those 60 yrs of age or more.

OTHER RISK FACTORS

There are other risk factors that are associated with coronary disease and mortality, although no prospective, randomized trials yet indicate that changing these factors changes cardiovascular outcomes in older population.

Obesity is one; in a study of over 41,000 older women, body fat distribution indexed by waist: hip ratio was associated with a strong, monotonic increase in the risk of cardiovascular, cancer, and total mortality. The waist: hip ratio is also the best marker for the metabolic hazards of obesity including insulin resistance, hypertension, and hyperlipidemia.

As age increases, the ratio of women to men in the patient population with ischemic heart disease also increases. Postmenopausal oestrogen use is associated with a decrease in the development of coronary disease and cardiovascular mortality, and of angiographic evidence of coronary atherosclerosis. These benefits may be related to a rise in HDL levels, inhibition of endothelial proliferation, and a favourable influence on coronary vasoreactivity.

Other factors associated with decreased cardiovascular outcomes in older individuals are physical activity status, dietary antioxidant flavonoid intake, plasma fibrinogen and factor VII activity, and dietary, although not supplemental vitamin E intake.

DIAGNOSIS AND EVALUATION OF SEVERITY

The diagnosis of coronary disease in an older individual should be considered with the realization that although silent ischemia is undoubtedly present in individuals of all age groups, it is particularly likely in the aged.

Baltimore Longitudinal Study of Aging population observed the prevalence of exercise-induced silent ischemia, defined by both electrocardiographic and thallium scintigraphic criteria, increased from 2% in fifth decade to 15% in the ninth decade of life.

The high prevalence of silent ischemia may be due to a diminished sensation of chest discomfort, the increased likelihood that ischemia will manifest as dyspnea rather than more typical pain symptoms, and the fact that other, superimposed diseases may render the older individuals less likely to exercise to the point at which angina symptoms occur.

It is important, therefore, to go beyond just a negative history if a degree of certainty is required regarding the absence of ischemic disease in the elderly.

EXERCISE ELECTROCARDIOGRAM

The most useful objective test is the exercise electrocardiogram. But the predictive accuracy of a positive test is low in the setting of an abnormal ECG. This is more likely in older individuals because of the increased prevalence of left bundle branch block, left ventricular hypertrophy, and digitalis ingestion.

In these circumstances, an exercise isotope examination would be useful. It should be noted that the predictive accuracy of a negative test is low in a population with a high prevalence of the disease.

Another concern in older population is an inability, because of other medical problems such as arthritis, or pulmonary insufficiency, to exercise to 85-90% of the predicted maximum heart rate. In this setting, the predictive accuracy of a negative test is low, and pharmacological testing with dipyridamol, adenosine, or dobutamine in conjunction with electrocardiographic, isotope, or echocardiographic monitoring is useful.

Prognosis in patients with stable coronary disease is dependent upon coronary anatomy and left ventricular function. Although the severity of symptoms is one means of evaluating the severity of atherosclerosis, the absence or presence of only minimal symptoms, particularly in the older age groups cannot be relied upon to indicate the presence of only minimal disease. In this situation, the non invasive stress ECG is useful, not only in diagnosing disease, but also in assessing the likelihood of triple vessel or left main coronary stenosis. Indicators of severe disease, even in asymptomatic or minimally symptomatic patients, include an early positive test, one that remains positive for more than 8 mins after the termination of exercise; more than 2 mm of ST segment shift; changes in the anterior and inferior leads with stress; a systolic fall in BP of more than 10-20 mmhg; and exercise induced malignant ventricular arrhythmias.

TREATMENT

It is often useful to consider whether noncardiac factors are present in an older individual who presents with new onset angina or a change in angina pattern. Anaemia frequently presents with ischemic symptoms in this age group. Hyperthyroidism in elderly often presents with cardiac manifestations, including arrhythmias and ischemia. Supraventricular arrhythmias, hypertension, and congestive heart failure are all more common in the elderly and increase myocardial oxygen demand requirements as well as decrease supply. Identification and reversal of these precipitating factors therefore, may return the older individual to the asymptomatic status.

MEDICAL THERAPY

Sublingual nitrates are the most effective agents for the relief of an acute ischemic episode. Continuous nitrates alone are not capable of providing continuous prophylaxis because of tolerance, which is present for oral, topical, as well as continuous intravenous use. Tolerance is not present for β-blockers and calcium antagonists, and both classes are effective anti-ischemic agents.

The choice of an anti-ischemic ß-blocker can be based on associated medical conditions and patient convenience. These can be used to decide whether to use a hydrophilic or lipophilic agent, as well as whether to use a cardio selective agent.

Calcium antagonists may provide additional benefit in patients who continue to experience angina despite ß-blocker therapy. Some calcium antagonists have antihypertensive, as well as anti-ischemic properties and are therefore especially useful in those angina patients with associated hypertension.

CORONARY ANGIOPLASTY

Angioplasty is an increasingly attractive option in elderly individuals with continued symptoms despite medical therapy. This is particularly true in those who are at increased risk with bypass surgery because it avoids thoracotomy, general anaesthesia, and prolonged convalescence associated with surgery. The development of newer techniques and increased experience in the treatment of multivessel disease has increased the number of elderly who are likely to experience significantly improved symptoms with angioplasty. In a recent report of 768 patients 65 yrs of age or more undergoing angioplasty, the technical success rate was 93.5%, in-hospital death rate was 1.4%; and 6-month death or myocardial infarction rate was 7.1%.

The International Society and Federation of Cardiology and the World Health Organization Task Force on Coronary Angioplasty lists angina in patients 75 yrs of age or older as a “class two” or “evolving” indication for coronary angioplasty.

CORONARY BYPASS SURGERY

Perioperative survival and long-term follow up following bypass surgery in elderly individuals are reported by several centers. In view of the fact that surgery is often reserved for older patients who have few other options, it is not surprising that perioperative survival is lower, and complications –including cognitive dysfunction-higher in older age groups. This can be related to increased prevalences of left main disease, left ventricular dysfunction, and advanced coronary disease in older patients undergoing revascularization. It is also related to other associated diseases, most importantly, pulmonary and renal dysfunction.

Despite a higher perioperative mortality, postdischarge survival is comparable to that in younger patients, and in the CASS registry report, surgical survival in patients over 65 yrs of age actually trended higher than survival in patients treated with medical therapy over a 6-yr follow up period.

ACUTE MYOCARDIAL INFARCTION

In the United States it is estimated that the elderly account for 60% of all deaths from acute myocardial infarction (AMI) and 10%of all patients with acute coronary syndromes (ACS). Although similar data is not available in our country, with improving life expectancy, there is no reason to believe that the situation will be substantially different.

Unique pathophysiological features of ageing make the elderly prone to atypical presentations of ACS and AMI. Symptoms of infarction in the elderly are more likely to include dyspnea and those related to decreased cardiac output, including mental status changes, rather than typical chest pain. Older individuals are also more likely to have an enzyme pattern consisting of an elevated MB fraction in the presence of a normal total Creatinine kinase (CK).

The highest risk group among patients with AMI is the elderly. In the GUSTO-I study the 30-day mortality in patients between 75 and 85 yrs of age was 6 times more, and in those over 85 yr, 10 times more than in patients under 65 yr of age.

ISSUES IN DIAGNOSIS

- The most important consideration is the frequency of silent presentations and atypical syndromes.
- Unrecognised myocardial infarction patients are more likely to be hypertensive, have diabetes, and smoke, and have a lower prevalence of preceding angina.
- A related issue is the tendency of elderly patients to present later to hospital. In an urban setting, Rajagopalan et al found that age >65 yrs independently predicted late presentation. This can be attributed to the presence of atypical symptoms.

- The initial ECG does not show typical ST elevation or Q waves in 40% of elderly patients and lower elevations in creatine kinase levels.

Therefore a high index of suspicion is essential for early diagnosis and institution of early appropriate therapy.

MANAGEMENT

Treatment of acute myocardial infarction in the elderly should be tempered by the knowledge that older individuals are several-fold more likely to suffer serious complications of infarct, including death, congestive heart failure, recurrent infarction, and rupture than their younger counterparts.

In the prethrombolytic era, the Multicenter Investigation of the Limitation of Infarct Size (MILIS) study group reported that 65-74 yr old patients with acute infarction have a higher frequency of congestive heart failure(44 versus 28%) in hospital death(14 versus 7%) and 1 yr mortality for hospital survivors (19 versus 5%) than those less than 65 yrs of age. The most striking finding on autopsy was a marked age-related increased finding of rupture. Rupture was present in over 80% of those older than 70 yrs of age who died and had autopsy examination.

FIBRINOLYTIC THERAPY

The principal issue in management is that of reperfusion therapy. Elderly patients tend to present later to hospital and a substantial proportion of patients therefore might not be eligible for fibrinolytic therapy (FT). Associated co-morbid conditions may result in relative contraindications to FT. The risk of intracranial bleeding and other major haemorrhagic complications are higher in patients older than 75 yrs.

Nevertheless, the absolute benefits of FT in this population is more pronounced than in younger age groups, primarily because of the higher baseline risk imposed by increased age and the higher prevalence of multivessel disease and poor left ventricular systolic and diastolic function. The Thrombolysis in Myocardial Infarction (TIMI)-2 investigators studied the impact of age on outcomes and the influence of postlytic management strategies in older infarct patients. They reported an increase in mortality, complications, and recurrent infarctions. This may be related to an age-related increase in delay to the administration of the thrombolytic, perhaps due to the increased likelihood of atypical presentations in older population, and to the fact that fewer older individuals were eligible to receive concomitant ß-blocker therapy.

CHOICE OF FIBRINOLYTIC AGENTS

Despite the marginally higher stroke rate with t-PA, the net benefit compared to SK is more pronounced in the patients up to 85 yrs of age.

PRIMARY ANGIOPLASTY

Primary angioplasty has been consistently associated with better outcomes and lower stroke rates than FT.

ADJUNCTIVE THERAPIES

ANTIPLATELET THERAPY

There is robust evidence suggesting that the absolute benefit of the use of aspirin in the management of AMI and ACS and in secondary prevention after these events is similar or greater in elderly than younger populations.

Clopidogrel use was associated with a 2% absolute reduction when added to aspirin in patients with ACS in CURE study.

The glycoprotein IIb/IIIa inhibitors have generally shown equivalent benefits across all age groups although most trials did not specifically look at the elderly population.

ANTITHROMBOTIC THERAPY

The elderly tend to have increased sensitivity to the anticoagulant effects of unfractioned heparin even after adjustment for body weight. Low-molecular – weight heparins are increasingly used to treat ACS. The existing data does not suggest any attenuation of benefit with age attributable to increased bleeding risk.

POST INFARCTION MANAGEMENT

Post infarction risk stratification is based on the same factors as those in the younger patients, that is, left ventricular function, the frequency and complexity of ventricular arrhythmias, and subjective or objective evidence of recurrent ischemia. Of several factors assessed in a prognostic study, Killip class was the most powerful predictor of survival in those aged 65 or more. Those who are at increased risk because of poor left ventricular function may benefit from revascularization procedures with angioplasty or bypass surgery, if viable myocardium is dysfunctional due to low flow.

There is a large body of data to recommend the use of ramipril, beta-blockers and statins in patients older than 65 yrs of age. Larger absolute risk reductions are generally seen in the elderly. Nevertheless, the use of these therapies in eligible elderly patients is under 50%.

If poor left ventricular function is due to extensive scar, ACE inhibitor therapy improves survival, decreases left ventricular filling pressures and cavity size, and improves exercise tolerance.

The reduction in fatal and nonfatal events following infarction in patients with ejection fractions of 40% or less in the Survival and Ventricular Enlargement trial (SAVE) was the same in those older and younger than65 yrs of age.

There is less to offer those judged to be at increased risk on the basis of post infarction arrhythmias. The inability of antiarrhythmics to decrease the mortality in these individuals is highlighted by the data from the Cardiac Arrhythmia Suppresion Trial, which indicated that the class IC agents encainide and flecainide were actually associated with an increase in cardiac mortality in patients over 60 yrs of age, in whom the risk ratio was four to five fold higher in the treated, as compared with the placebo groups. Some reports indicate amiodarone may improve survival.

Those who have recurrent ischemic symptoms, or who have a positive electrocardiogram on stress testing, are at increased risk of recurrent infarction or death over the ensuing year and are generally considered for more aggressive diagnostic evaluation, including cardiac catheterization, in order to assess the suitability for revascularization procedures. If individuals are judged to be at low risk, one aspirin a day may be effective prophylaxis. Older patients also

benefit from the routine use of ß-blockers. Both the Norwegian Timolol study and the ß-blocker Heart Attack (BHAT) propanolol study demonstrated a significant improvement in survival for those over 60-65 yrs of age in the ß-blocker as compared with the placebo groups. Finally, an extensive trial of continuing versus discontinuing anticoagulation following myocardial infarction in 878 patients over 60 yrs of age indicated that anticoagulation reduced the 2-yr incidence of recurrent infarction (from 15.9% in the placebo group to 5.7% in the treated group) and of total mortality (from13.4%in the placebo to 7.6% in the treated group) over a 2-yr follow-up period. This benefit was not outweighed by significant intracranial or extra cranial bleeding events.

MATERIALS AND METHODS

This study was conducted during JUNE 2009 to NOVEMBER 2009 period. 60 consecutive patients of age 65 and above admitted to the coronary care unit with a diagnosis of acute STEMI were included in the study.

All patients included in the study were subjected to ECG examination with conventional 12 leads and in addition V_3R, V_4R, V_7 to V_9. Rhythm strips were taken in patients with arrhythmia.

All patients were assessed clinically and electrocardiographically to make a diagnosis of STEMI. Special emphasis made on presenting complaints, risk factor, comorbidities, vital signs, arrhythmias and mortality. All patients were followed up till death or discharge. Pre-discharge ECHO was done to assess the LV function.

Patients with age less than 65 and patients with NSTEMI, UA, Recurrent MI are excluded from the study.

OBSERVATION AND RESULTS

The observations in 60 elderly patients with acute STEMI (ST Elevation Myocardial Infarction) is presented in this section in descriptive and tabular form.

AGE

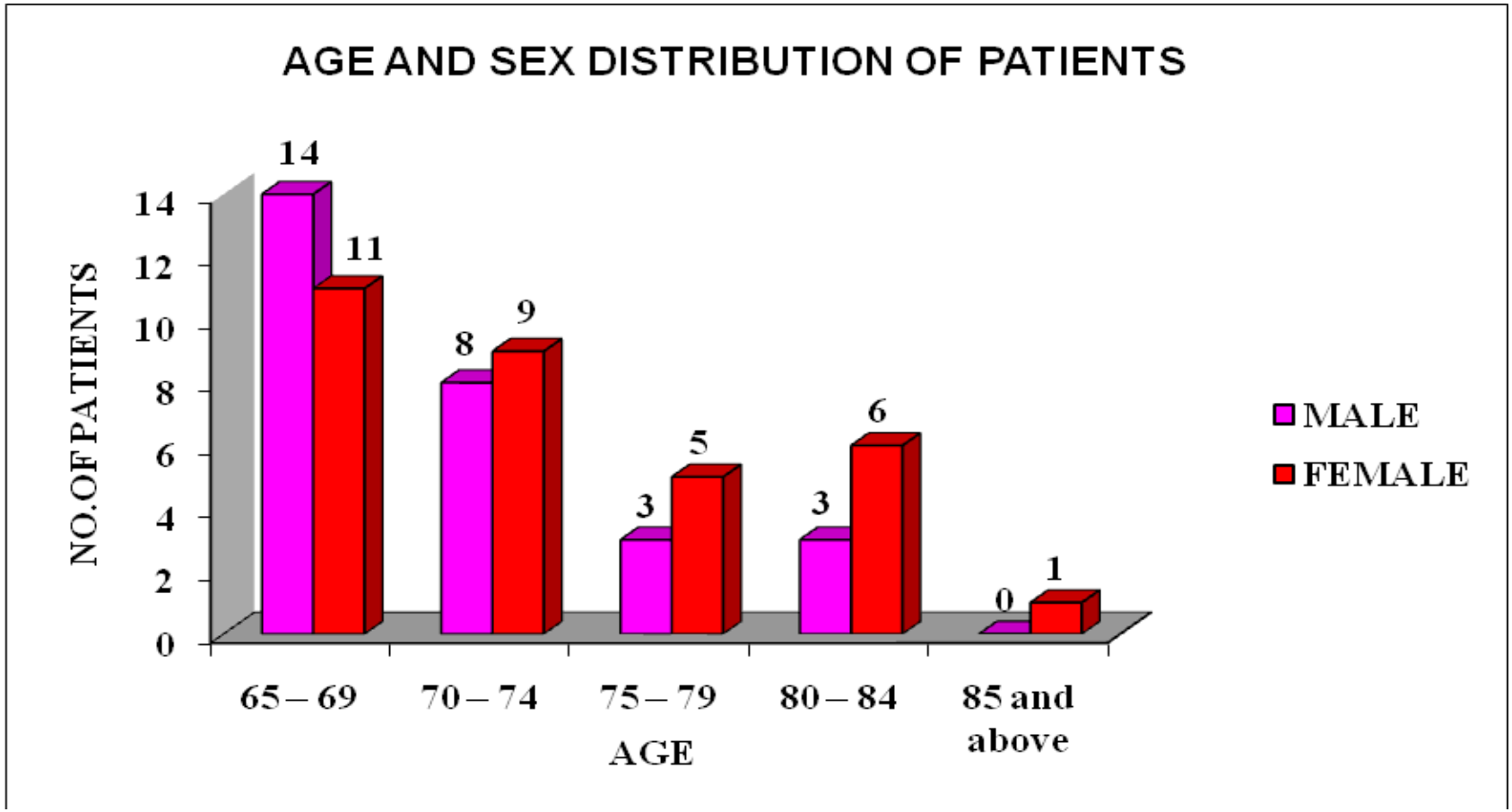
Cases were divided into groups of 5 years difference for comparing age and sex incidence.

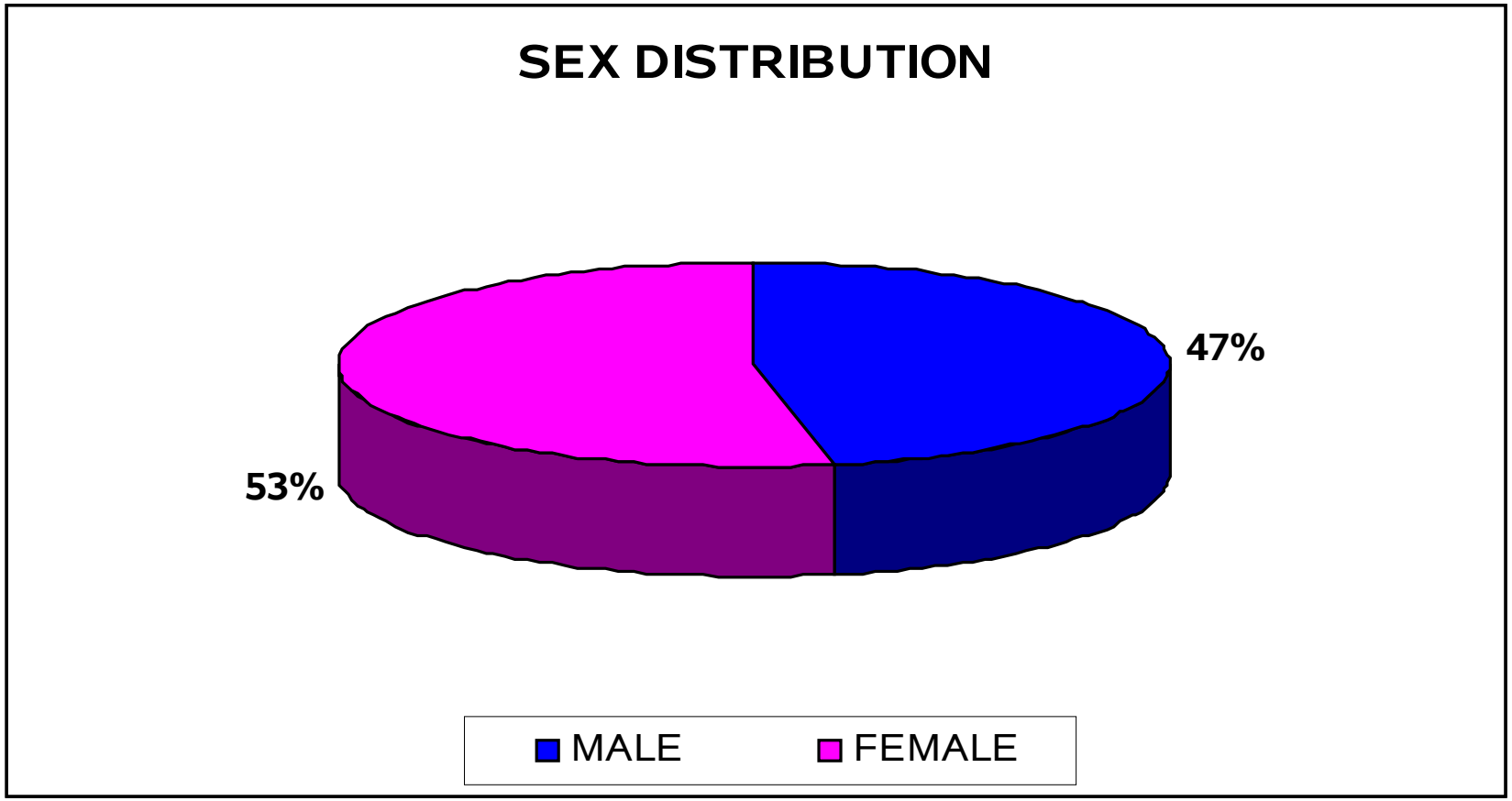
Incidence in male and female almost equal in the age group 65 – 74. The incidence is increased in females in age group 75 and above. The highest age was a female with 85 years old.

32 patients were females and 28 were males.

TABLE 1

AGE	NO. OF PATIENTS	PERCENT	MALE	FEMALE
65 – 69	25	42%	14	11
70 – 74	17	28%	8	9
75 – 79	8	13%	3	5
80 – 84	9	15%	3	6
85 and above	1	2%	0	1


AGE AND SEX DISTRIBUTION OF PATIENTS
NO.OF PATIENTS
0
2
4
6
8
10
12
14
14
11
8
9
3
5
3
6
0
1
65 – 69
70 – 74
75 – 79
80 – 84
85 and above
AGE
MALE
FEMALE


SEX DISTRIBUTION
47%
53%
MALE
FEMALE

PRESENTING SYMPTOMS

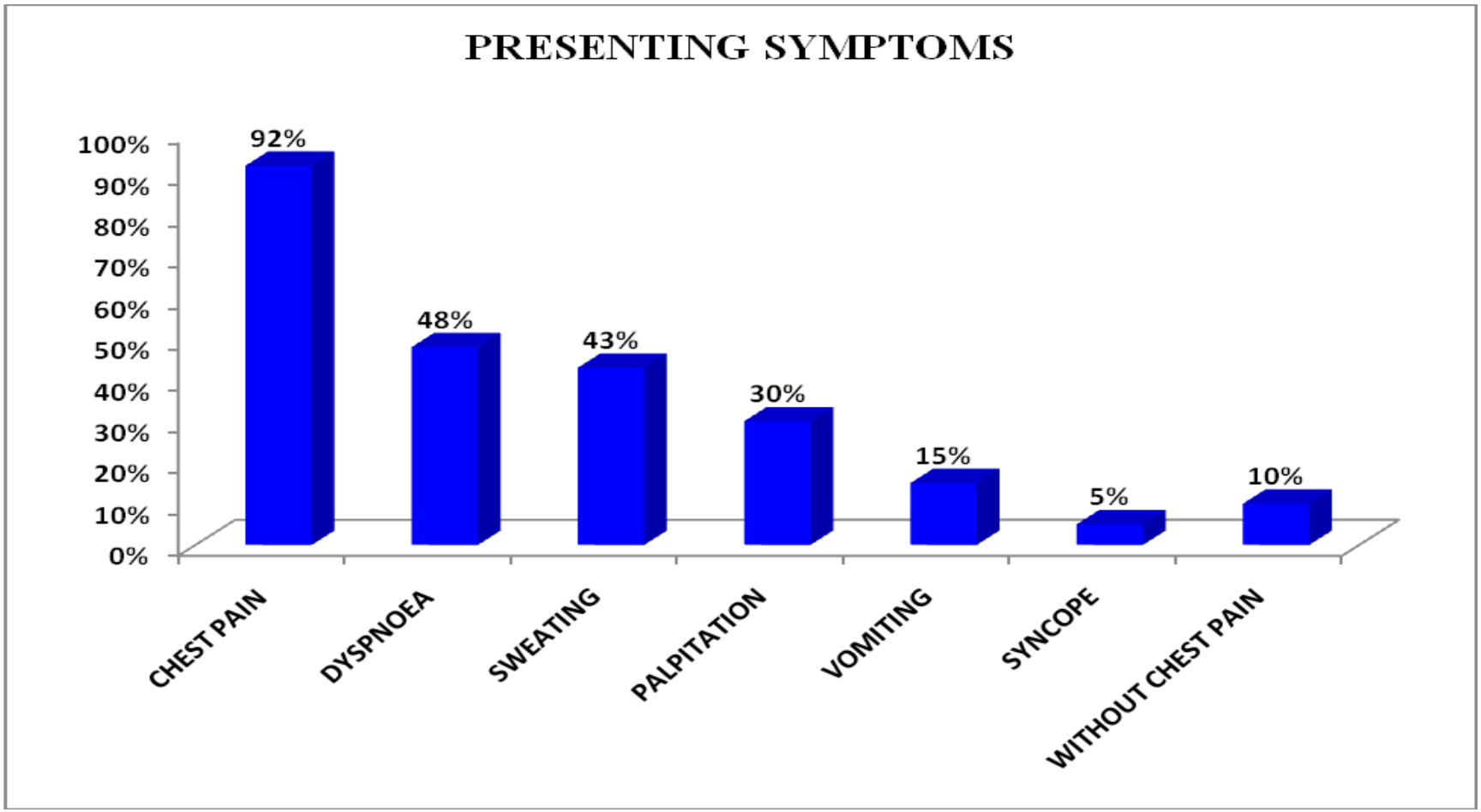
CHEST PAIN

55 patients had complaints of retrosternal chest pain. 5 patients who did not have chest pain as presentation had dyspnoea as presenting complaint.

TABLE 2

PRESENTING SYMPTOMS

Sl.No	SYMPTOMS	NO.	PERCENT
1	CHEST PAIN	55	92%
2	DYSPNOEA	29	48%
3	SWEATING	26	43%
4	PALPITATION	18	30%
5	VOMITING	10	15%
6	SYNCOPE	3	5%
7	WITHOUT CHEST PAIN	5	10%


PRESENTING SYMPTOMS
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
92%
48%
43%
30%
15%
5%
10%
CHEST PAIN
DYSPNOEA
SWEATING
PALPITATION
VOMITING
SYNCOPE
WITHOUT CHEST PAIN

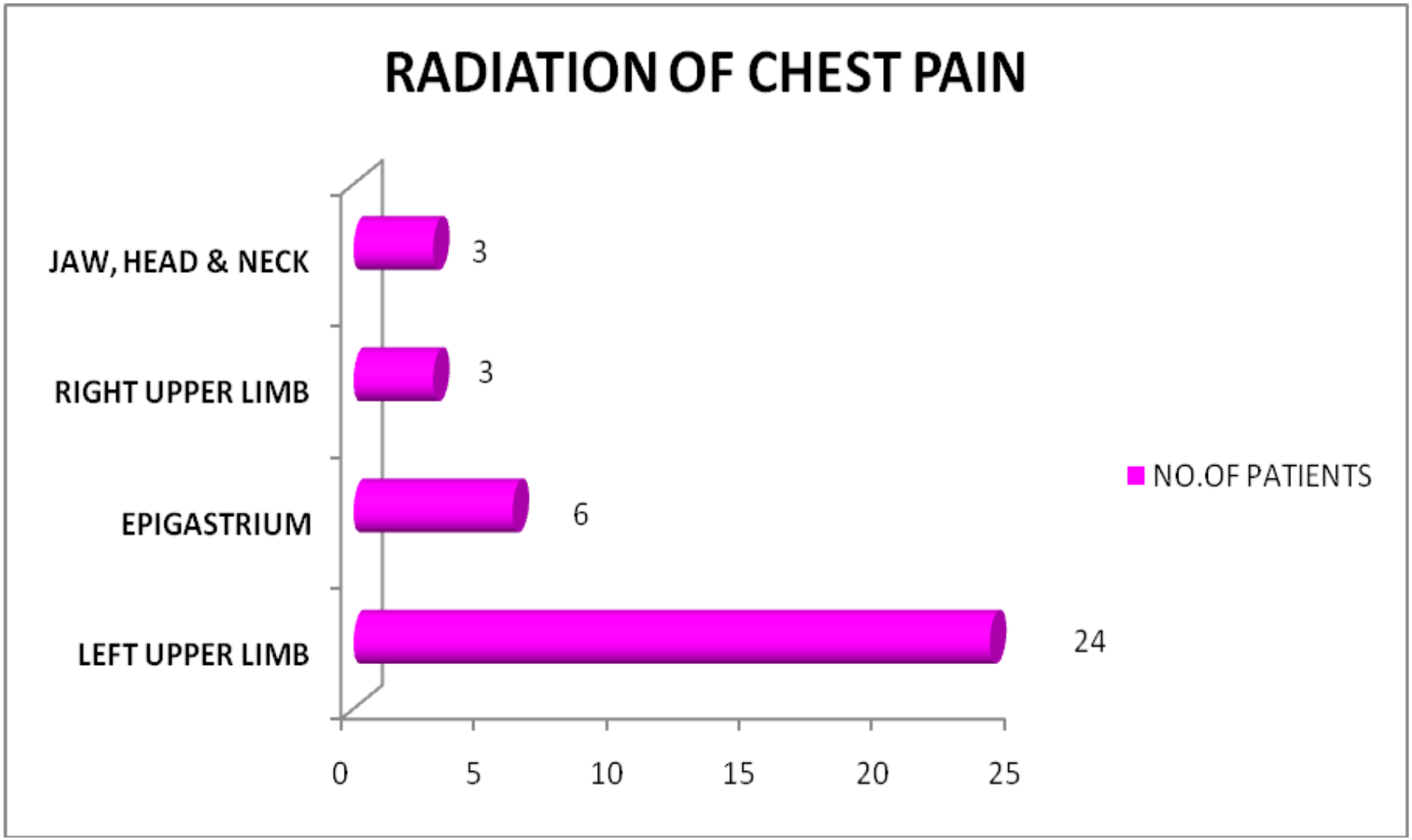
RADIATION OF CHEST PAIN

Radiation of Chest Pain was noticed in 36 patients (60%). Radiation to Left Upper limb was seen in 24 patients (40%), 6 patients had radiation to epigastrium (10%), another 3 patients (5%) had radiation to Right Upper Limb. Other site of radiation in 3 patients (5%).

TABLE 3

RADIATION OF CHEST PAIN

S.No	RADIATION SITE	NO.OF PATIENTS	PERCENT
1	LEFT UPPER LIMB	24	40%
2	EPIGASTRIUM	6	10%
3	RIGHT UPPER LIMB	3	5%
4	JAW, HEAD & NECK	3	5%


RADIATION OF CHEST PAIN
JAW, HEAD & NECK
3
RIGHT UPPER LIMB
3
EPIGASTRIUM
6
LEFT UPPER LIMB
24
NO.OF PATIENTS
0
5
10
15
20
25

Duration of symptoms

The time duration from the onset of symptoms and patient reaching the hospital was noted. Sixteen patients (26%) presented after 24 hours. 44 patients presented within 24 hours. Among them, only 17 patients (29%) were able to reach the hospital within six hours.

TABLE 4

DURATION OF SYMPTOMS

TIME	NO. OF PATIENTS	PERCENT
0 – 6 hrs	17	29%
6 – 12 hrs	27	45%
More than 12 hrs	16	26%

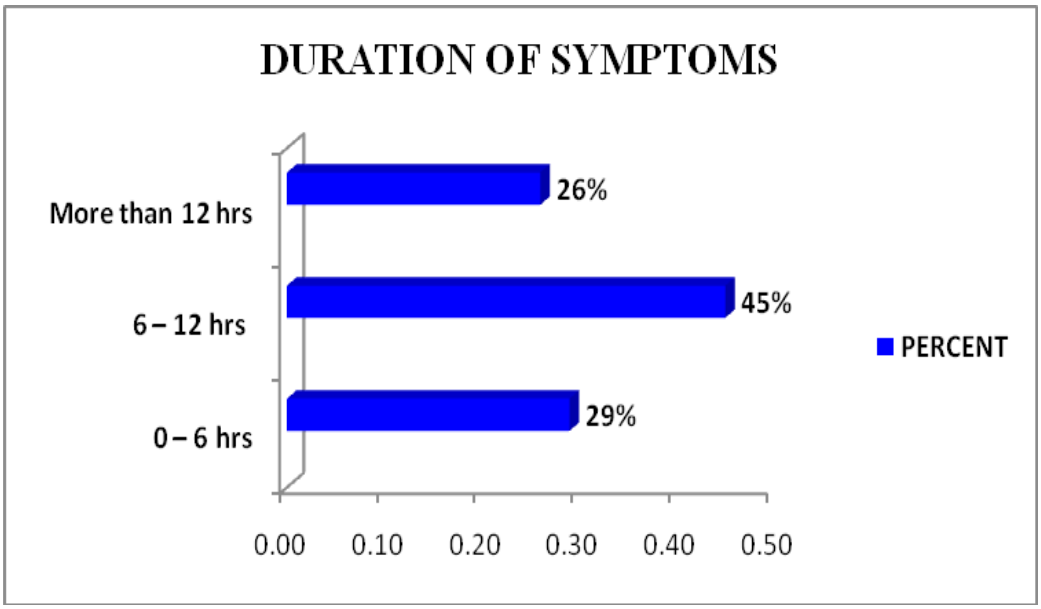


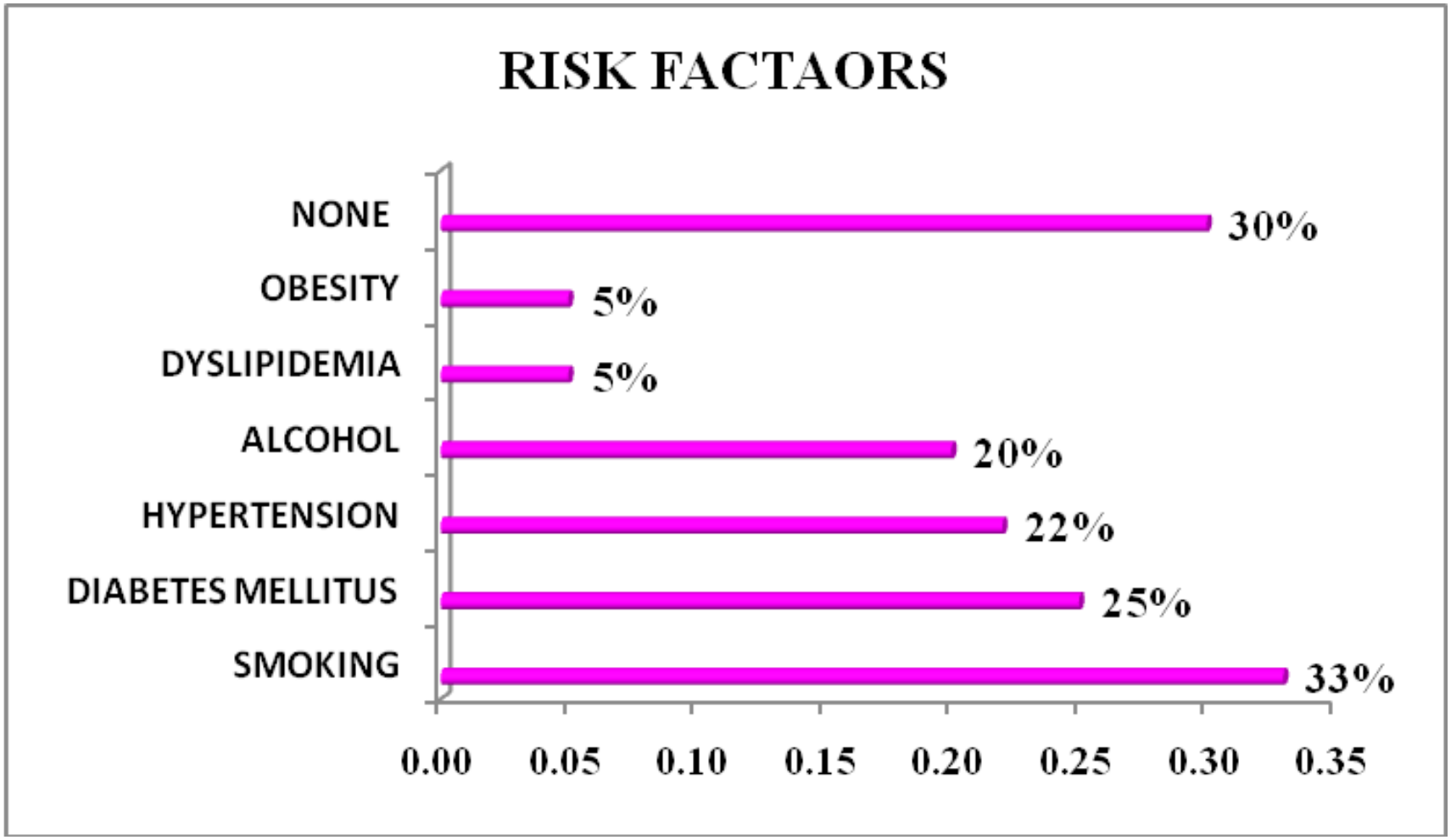
TABLE 4

RISK FACTORS

VARIABLE	NO. OF PATIENTS	PERCENT	MALE	FEMALE
SMOKING	20	33%	20	0
DIABETES MELLITUS	15	25%	8	7
HYPERTENSION	13	22%	5	8
ALCOHOL	12	20%	12	0
DYSLIPIDEMIA	3	5%	1	2
OBESITY	3	5%	1	2
NONE OF THE ABOVE	18	30%	3	15

Diabetes Mellitus

15 patients (25%) had diabetes and all of them were on oral hypoglycaemic agents. An attempt was made to go through the earlier medical records wherever available.


RISK FACTAORS
NONE
OBESITY
DYSLIPIDEMIA
ALCOHOL
HYPERTENSION
DIABETES MELLITUS
SMOKING
30%
5%
5%
20%
22%
25%
33%
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35

Systemic Hypertension

Patients were considered to be hypertensive if they had been told to have hypertension earlier by a doctor and put on antihypertensive drugs or serial BP recordings in hospital were consistently high. 13 patients had hypertension (22%).

Smoking

Out of 28 males, 20 were smokers. None of the female patients were smokers. All the smokers were smoking 10 – 20 beedies/cigarettes per day for atleast 10 years. 60% of them were current smokers.

Alcohol

Out of 28 male, 12 were in habit of consuming alcohol. None of the female patients were in the habit of consuming alcohol.

Dyslepidemia

3 patients were found to have dyslipidemia which was detected on routine check up elsewhere. None of them were on lipid lowering agents.

Obesity

3 patients (5%) were found to be obese. Body Mass Index was calculated for all patients.

CLINICAL PRESENTATION

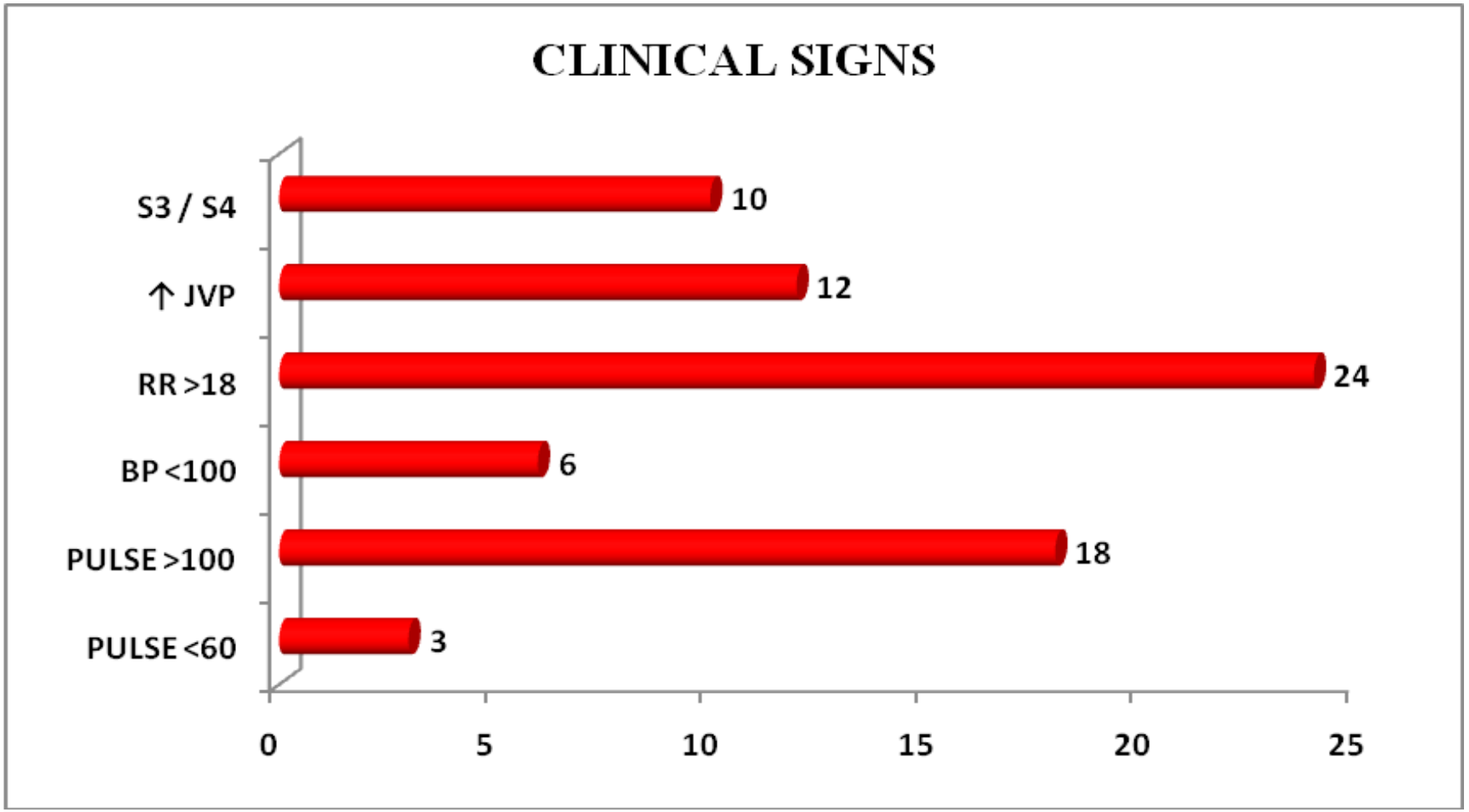
3 patients (5%) had bradycardia. Tachycardia was seen in 18 patients (30%). Hypotension was noticed in 6 patients (10%). Tachypnoea was

observed in 24 patients (40%). 12 patients (20%) had raised JVP. Third or fourth heart sound were detected in 10 patients (15%).

TABLE 5

CLINICAL PRESENTATION

CLINICAL SIGN	NO. OF PATIENTS	PERCENT
PULSE <60	3	5%
PULSE >100	18	30%
BP <100	6	10%
RR >18	24	40%
↑ JVP	12	20%
S3 / S4	10	15%


CLINICAL SIGNS
S3 / S4
↑ JVP
RR >18
BP <100
PULSE >100
PULSE <60
10
12
24
6
18
3
0
5
10
15
20
25

KILLIPS CLASS

Patients were assigned to Killips class depending on the signs of heart failure at the time of presentation.

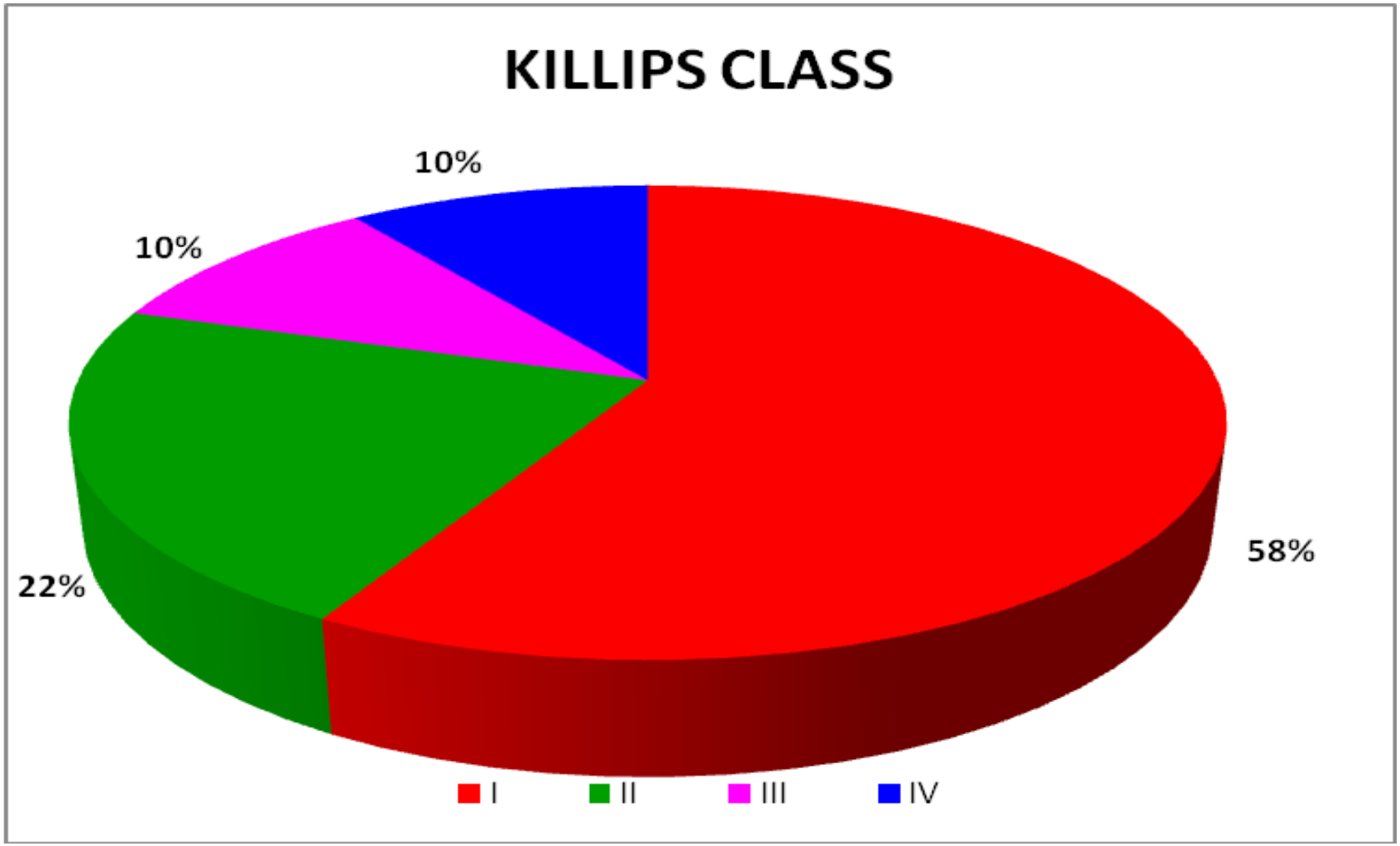
- ❖ Class I - No heart failure
- ❖ Class II - Mild to moderate heart failure.
  (Presence of S3, Rales at the base or rales not exceeding half of the chest)
- ❖ Class III - Severe heart failure(pulmonary edema)
- ❖ Class IV - Cardiogenic shock

35 patients (58%) presented in Killips class I. 13 patients (22%) were in Killips Class II. Class III and Class IV each consisting 6 patients (10%).

TABLE 6

KILLIPS CLASS

CLASS	NO. OF PATIENTS	PERCENT
I	35	58%
II	13	22%
III	6	10%
IV	6	10%


KILLIPS CLASS
10%
10%
22%
58%
I
II
III
IV

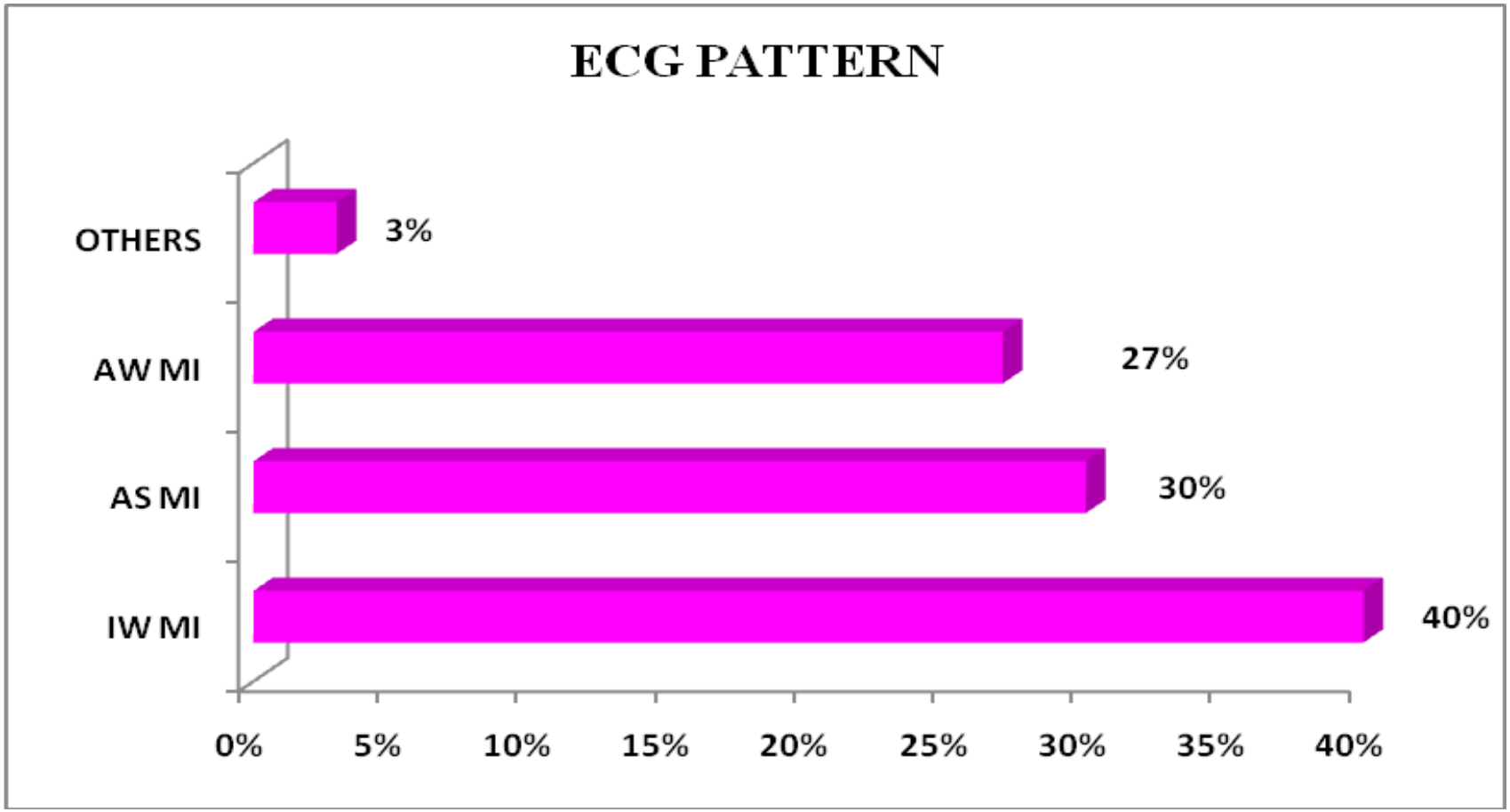
ECG Patten

ECG evidence of Inferior Wall MI was observed in 24 patients (40%). Anteroseptal MI was noted in 18 patients (30%). Extensive Anterior wall MI was observed in 16 patients (27%). Other patterns were observed in 2 patients (3%).

TABLE 7

ECG PATTERN

Sl.No.	PATTERN OF MI	NO. OF PATIENTS	PERCENT
1	IW MI	24	40%
2	AS MI	18	30%
3	AW MI	16	27%
4	OTHERS	2	3%


ECG PATTERN
OTHERS
AW MI
AS MI
IW MI
3%
27%
30%
40%
0%
5%
10%
15%
20%
25%
30%
35%
40%

ARRYTHMIAS

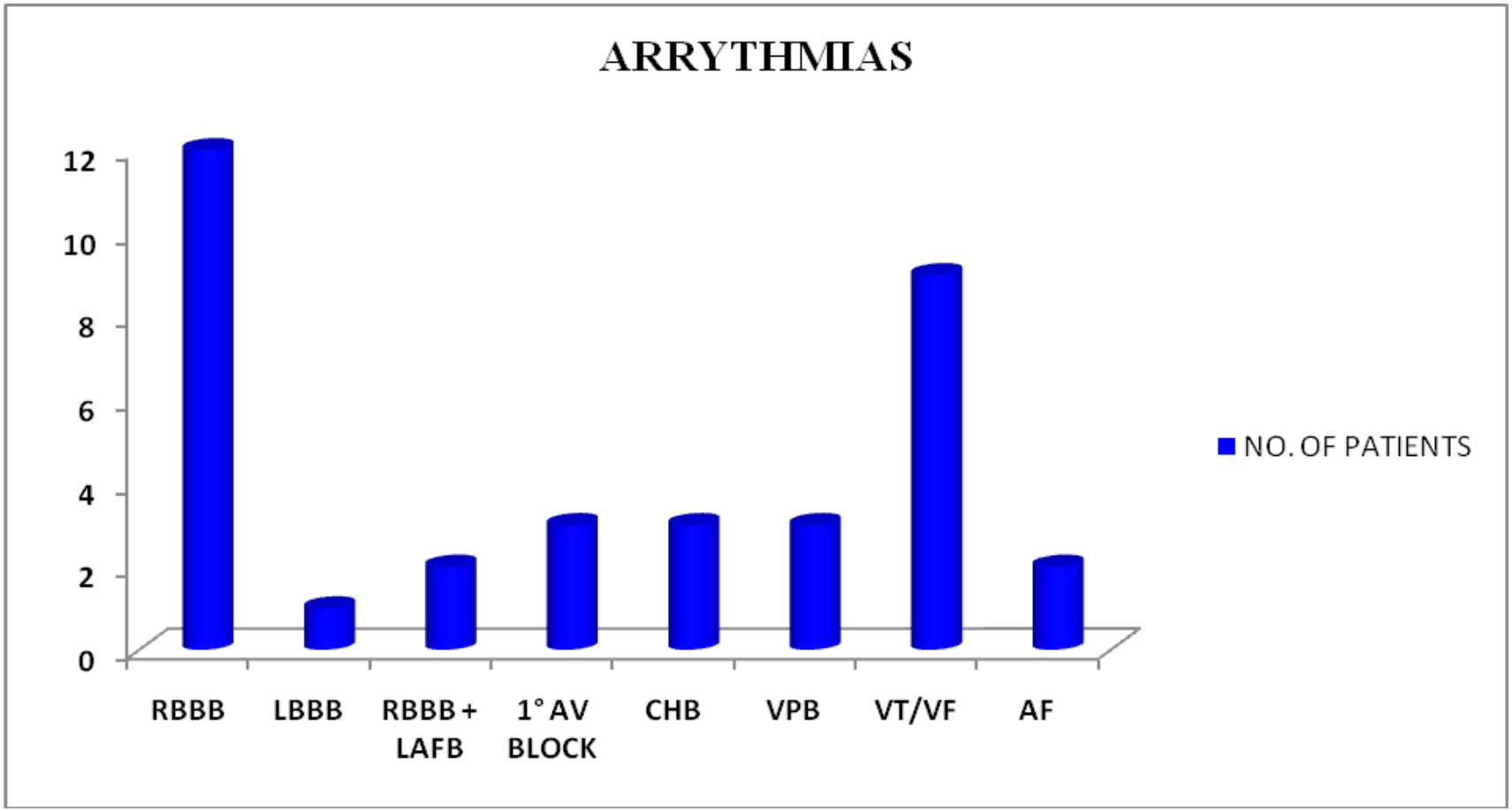
RBBB was observed in 12 patients (20%). LBBB was noted in one patient. Bifascular block (RBBB + LAFB) was seen in 3 patients (5%).

First degree AV block seen in 3 patients (5%). Complete heart block developed in 3 patients (5%).

Ventricular premature beats were observed in 3 patients (5%). Ventricular Tachycardia or Ventricular fibrillation occurred in nine patients (15%). Atrial fibrillation was present in two patients (3%).

TABLE 8

Sl.No.	ARRYTHMIA	NO. OF PATIENTS	PERCENT
1	RBBB	12	20%
2	LBBB	1	2%
3	RBBB + LAFB	2	3%
4	1° AV BLOCK	3	5%
5	COMPLETE HEART BLOCK	3	5%
6	VENTRICULAR PREMATURE BEATS	3	5%
7	VENTRICULAR TACHYCARDIA OR VENTRICULAR FIBRILLATION	9	15%
8	ATRIAL FIBRILLATION	2	3%


ARRYTHMIAS
12
10
8
6
4
2
0
RBBB
LBBB
RBBB + LAFB
1° AV BLOCK
CHB
VPB
VT/VF
AF
NO. OF PATIENTS

MORTALITY

Out of total 60 patients, 15 patients (25%) expired in the hospital. 8 patients were female and 7 were male. 7 patients were of age 65 – 74. 8 patients were of age 75 and above.

TABLE 9

AGE AND SEX DISTRIBUTION OF DEATHS

AGE	MALE	FEMALE	TOTAL
65 – 74	4	3	7
75 & Above	3	5	8
Total	7	8	15

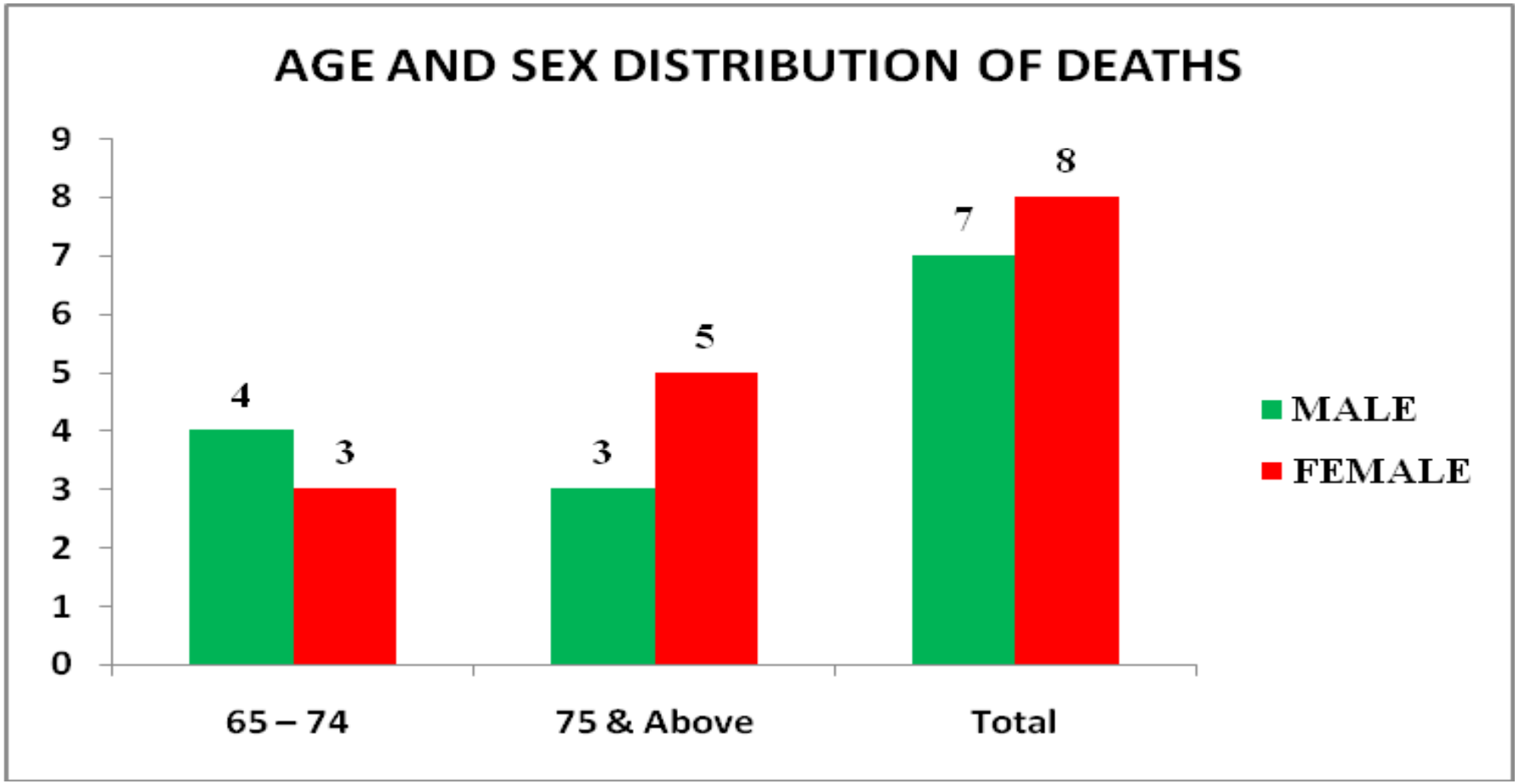

AGE AND SEX DISTRIBUTION OF DEATHS
9
8
7
6
5
4
3
2
1
0
4
3
3
5
7
8
65 – 74
75 & Above
Total
MALE
FEMALE

TABLE 10

AGE AND MORTALITY

AGE	NO. OF PATIENTS		MORTALITY IN PERCENT
	TOTAL	DEATHS	
65 – 74	42	7	16%
75 & Above	18	8	44%

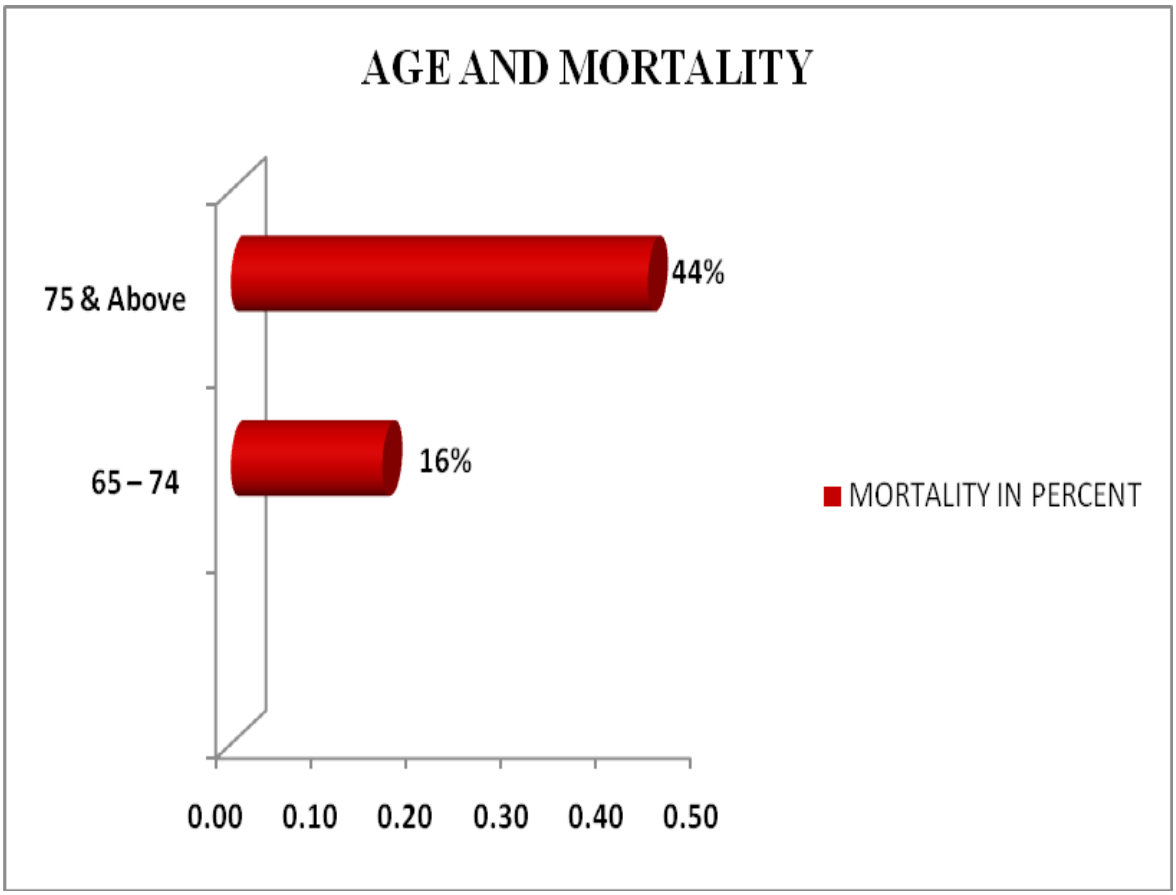
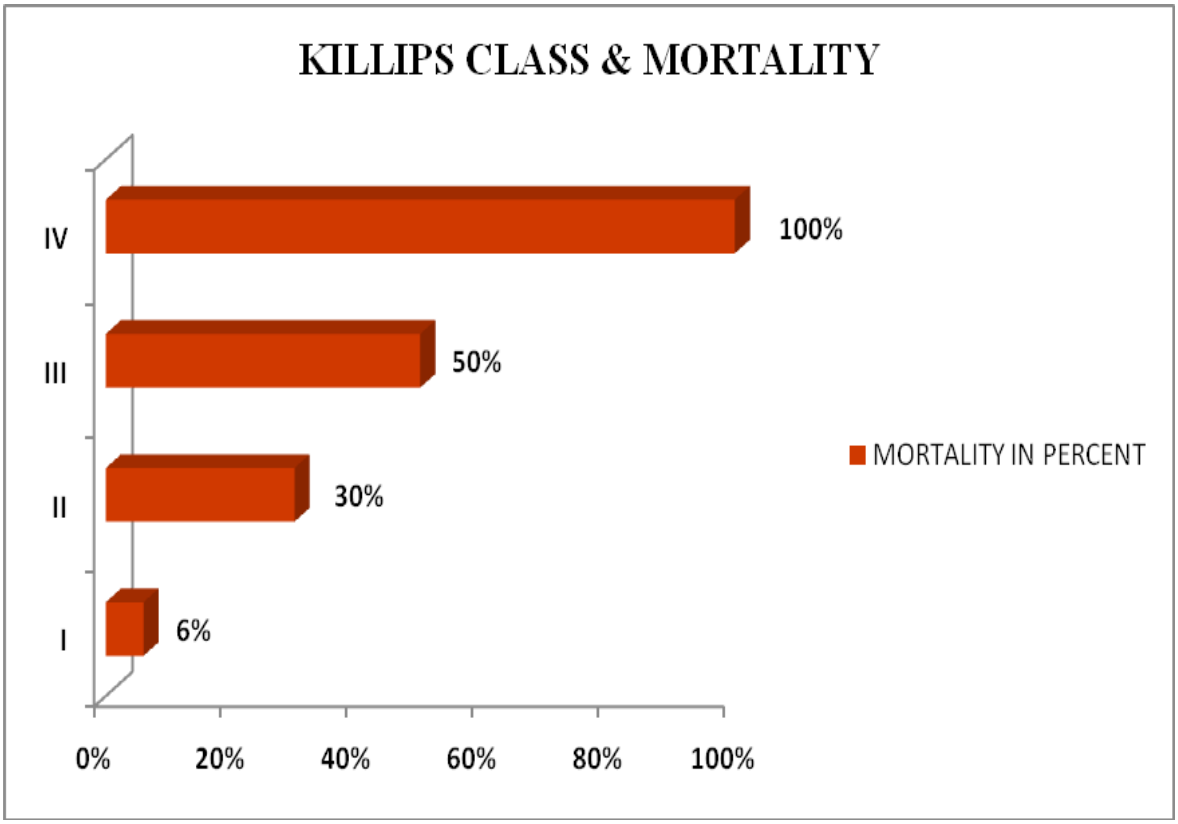


TABLE 11

KILLIPS CLASS & MORTALITY

CLASS	NO. OF PATIENTS	DEATHS	MORTALITY IN PERCENT
I	35	2	6%
II	13	4	30%
III	6	3	50%
IV	6	6	100%



DISCHARGE

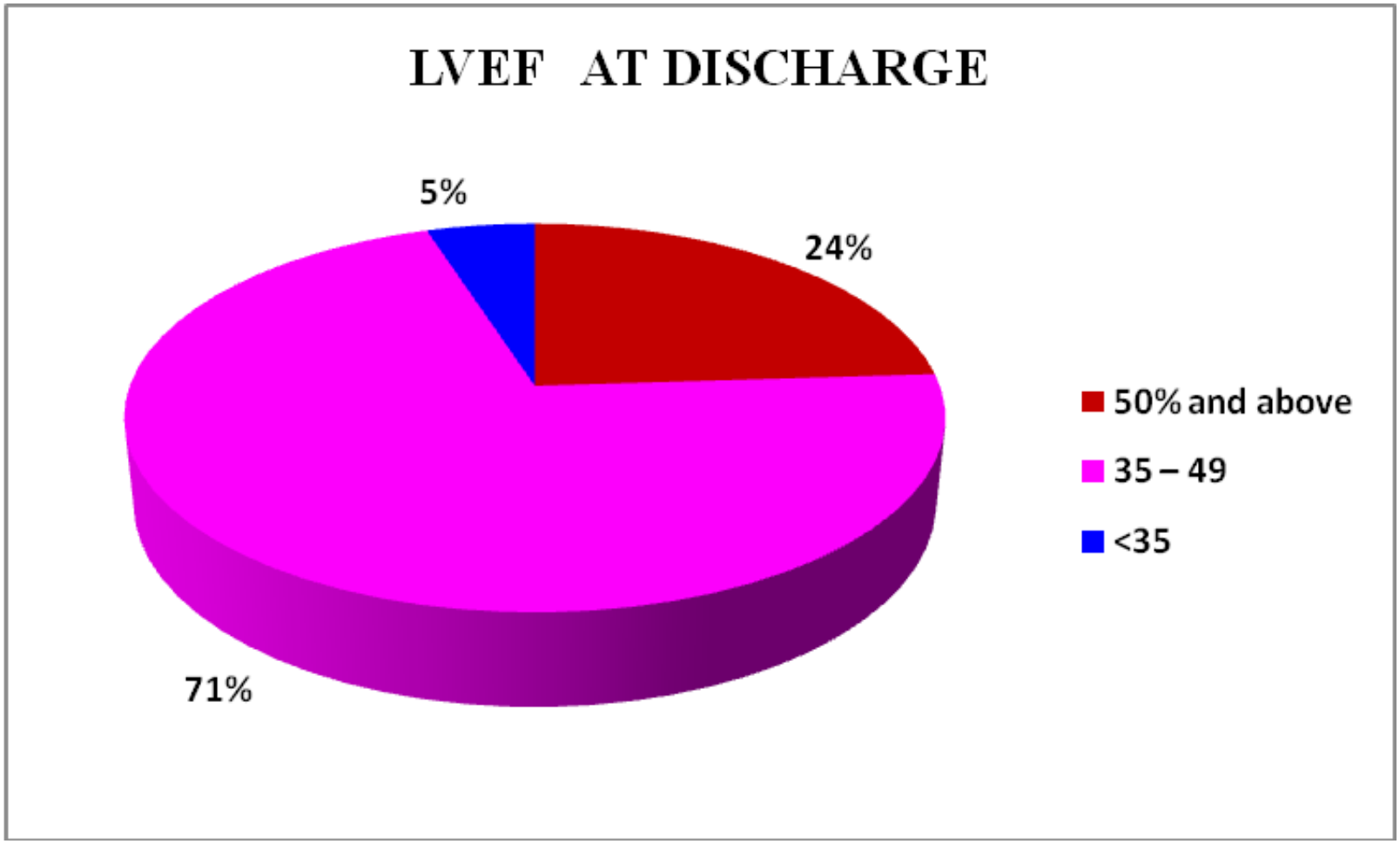
45 out of 60 patients were discharged. Pre discharge ECHO was done to assess LV systolic function. 32 patients (71%) showed mild-to-moderate LV

dysfunction. 2 patients (5%) showed severe LV dysfunction. 11 patients (24%) showed near normal LV function.

TABLE 12

LVEF AT DISCHARGE

Sl.No.	LVEF	NO. OF PATIENTS	PERCENT
1	50% and above	11	24%
2	35 – 49	32	71%
3	<35	2	5%


LVEF AT DISCHARGE
5%
24%
71%
50% and above
35 – 49
<35

DISCUSSION

Sixty proven cases of Acute ST Elevation Myocardial infarction of Age 65 and above were selected for analysing the various risk factors, clinical features and complications. All patients were subjected to ECG examination of conventional 12 leads, V_3R V_4R and $V_7V_8V_9$ and rhythm strip wherever needed.

On analysing the incidence, it was found that STEMI in elderly is slightly more in females. 53% were females and 47% were males. It is a contrast with the middle age where MI is more common in males.

92% of patients presented with chest pain. All of them had typical retrosternal chest pain. All the patients had chest pain lasting for more than 30 minutes. Most of the patients developed chest pain while at rest.

When analysing symptoms other than chest pain, Dyspnoea is observed in 48% of patients. This points out the fact that elderly tend to have more dyspnoea than the younger for the given compromised cardiovascular status.

Patients presented without chest pain were around 10%. These patients had either dyspnoea or syncope. These kinds of observations were well recognised. In the Framingham study, atypical presentation is around 30% in male aged 75 – 84 years compared with only 5% in men aged 45 – 54.

On analysing the duration of symptoms, i.e. the time taken from the start of symptoms and to reach the hospital, only 74% reached the hospital within 12 hrs. This is the window period where thrombolysis is effective and myocardium could be salvaged. 26% of patients presented late and not eligible for

thrombolytic therapy. Rajagopalan et al in his study found that age >65 years independently predicted late presentation.

On analysing the risk factors for MI, smoking (33%) was the most common and exclusively in males. None of the females were smokers.

In common to both males and females, diabetes is the leading risk factor which was observed in 25%. Hypertension and dyslipidemia were observed in 13% and 5% respectively. All Dyslipidemics were found to be coexisting with diabetes.

Obesity is not observed significantly. It was around 5%.

Hector Beuno et al in his studies had analysed the incidence of risk factors. He had found hypertension in 45%, Diabetes Mellitus in 23%, smoking in 63%, obesity in 22%, Dyslepidemia in25%.

On analysing the clinical presentation, most observed signs were Tachypnea and Tachycardia, 40% and 30% respectively. 35% of patients had no evidence of heart failure i.e. Killips Class I. 22% of patients had creps not exceeding half of chest i.e. Killips Class II. 10% were having extensive rales and elevated JVP i.e. Killips Class III. Another 10% of patients were in Cardiogenic shock i.e. Killips Class IV.

This shows that the elderly tend to present higher Killips class (20%) which significantly predicts the higher morbidity and mortality they tend to develop.

On analysing the pattern of MI, the inferior wall myocardial infarction was the most common (40%) followed by Anteroseptal MI and Anterior Wall MI 18% and 16% respectively. Other patterns were observed in 3%.

On analysing the IWMI, 25% associated with posterior wall involvement and 33% associated with right ventricular involvement. Chockalingam et al in his study revealed RVMI was seen in one third of acute IWMI.

The significant percentage of AWMI i.e. 27% reveals that higher degree of CAD. In a contemporary clinical trial data base patients above 80 years who underwent angiography had a 72% prevalence of multivessel disease as against 33% in patients less than 65 years of age.

On looking into the treatment, 64% received thrombolytic therapy, 36% had not received. Analysing the reasons for not thrombolysed, most of them i.e. 16 out of 22 patients presented late. Another 6 patients were in hypotension.

On follow up, arrhythmic complications were observed in 45%. The most commonly observed arrhythmia was RBBB (20%), followed by VT/VF (15%).

Bifasicular block was observed in 5% and complete heart block was around 5%. All patients who developed complete heart block were treated with temporary pacing. Reported incidence for CHB by Pillip Podrid et al is around 8%.

Atrial fibrillation was observed in only 2 patients. Among the two, one had coexisting RHD (3%). Peter Berger et al in his studies of complication of

Acute Myocardial Infarction found atrial fibrillation in 10% of patients with IWMI.

On analysing the deaths, the mortality is high around 25%. Most of the deaths happened in Killips Class III, Class IV and age >75.

GUSTO I Trial clearly established that the old age is the independent risk factor for high mortality (31.2%).

45 out of 60 patients were discharged from the hospital. Among them 11 patients (24%) showed near normal LV function (EF >50%). 32 patients (71%) showed mild to moderate LV dysfunction (EF 35 – 49%). 2 patients (5%) showed severe LV dysfunction (EF <35%).

Among the discharged, 34 patients (76%) left with underlying morbidity in the form of LV dysfunction. They have to be evaluated for further risks of coronary events and to be followed up with medical management and revascularisation, if indicated.

CONCLUSION

1. The incidence of STEMI in elderly 65 years and above is more common in females, the difference being high as the age advances.
2. Even though chest pain is the most common presentation, atypical presentation without chest pain is also high (10%).
3. Delayed presentation is common (26%).
4. Tachypnea and Tachycardia are the most commonly observed signs.
5. Smoking is the most common risk factor (33%) followed by Diabetes Mellitus (25%). Patients without any conventional risk factors were 30%.
6. Higher Killips class is common (20%).
7. The most common pattern is IWMI (40%).
8. Significant number of patients (36%) were not thrombolysed.
9. Mortality is high (25%). Mortality is higher in females than males and is higher in age >75 than age <75.
10. Post infarction morbidity in the form of LV dysfunction is high (76%).

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ANNEXURE

- **PROFORMA**
- **MASTER CHART**
- **ETHICAL COMMITTEE APPROVAL ORDER**
- **ABBREVIATIONS**

PROFORMA

Name : **Age :** **Sex :**

Address : **Height :** **Weight :** **BMI :**

Clinical presentation:

Duration of symptoms:

Hypertension: **Diabetes:** **Hyperlipidemia :**

Family history of IHD:

Previous MI:

Other co-morbidities:

Smoking: **Alcohol:** **Diet:**

General Examination

Conscious Level:

Orientation:

PR: BP: RR: JVP:

Anaemia:

Cyanosis:

Clubbing:

Icterus:

Pedal Edema:

CVS

Heart sounds: Murmurs: Rub:

RS

Air entry: Crackles / Wheeze:

P/A

CNS

INVESTIGATIONS

1. Urine R/E: Albumin: Sugar: Deposits:
2. CBC:
   - TC:
   - DC:
   - ESR:
   - Hb:
   - PLC:
3. RBS
4. Urea
5. Creatinine
6. Electrolytes
7. Chest PA view
8. ECG
9. ECHO

TREATMENT

- Thrombolysis
- PCI
- None

COMPLICATIONS

- Reinfarction
- Arrythmias
- Hypotension

- Acute MR
- CCF
- Cardiogenic shock
- Others
- Death

MASTER CHART

S.No.	Name	Age	Sex	DOA	ANGINA	RADIATION	SWEATING	DYSPNOEA	PALPITATION	VOMITING	SYNCOPE	DURATION	DM	HT	CAD	DYSLIPIDEMIA	SMOKING	ALCOHOL	OTHERS	PR	BP	RR	JVP	S3 / S4
1	Kokila	68	F	02.06.09	+	+	+	-	-	-	-	8 hrs	-	-	-	-	-	-	-	90	100/70	16	-	-
2	Sundaraj	65	M	04.06.09	+	-	-	+	-	-	-	9 hrs	-	-	-	-	+	-	-	100	110/80	20	-	-
3	Chockalingam	67	M	06.06.09	+	+	+	+	+	-	-	4 hrs	-	-	-	-	+	+	-	124	80/60	40	+	+
4	Hayath Basha	72	M	06.06.09	+	+	-	-	-	-	-	6 hrs	-	-	-	-	+	-	-	90	110/80	14	-	-
5	Daisy	65	F	07.06.09	+	-	-	-	+	+	-	8 hrs	-	-	-	-	-	-	-	98	130/80	16	-	-
6	Ammaayeeammal	70	F	18.06.09	-	-	-	+	+	+	-	3 hrs	-	-	-	-	-	-	-	126	80/50	32	+	+
7	Mohanavel	67	M	20.06.09	+	+	-	-	-	-	-	10 hrs	+	-	-	-	+	-	-	90	130/80	14	-	-
8	Abdul Azeez	67	M	27.06.09	+	-	+	-	-	-	-	1 week	-	-	-	-	-	+	-	70	100/80	18	-	-
9	Sakunthala	68	F	29.06.09	+	+	+	+	-	-	-	11 hrs	-	-	-	-	-	-	-	116	110/80	26	-	-
10	Alamelu	82	F	30.06.09	+	-	-	-	-	-	-	6 hrs	-	-	-	-	-	-	-	98	110/80	14	-	-
11	Raman	68	M	30.06.09	+	+	+	-	+	-	-	3 hrs	-	-	-	-	+	+	-	50	130/70	18	-	-
12	Kannamal	70	F	04.07.09	+	-	+	-	-	-	-	12 hrs	-	-	-	-	-	-	-	120	160/90	16	-	-
13	Leela	65	F	07.07.09	+	-	+	-	+	-	-	6 hrs	+	-	+	+	-	-	-	130	90/60	30	+	+
14	Puratchimani	68	F	08.07.09	+	+	+	-	-	+	-	5 hrs	+	+	-	-	-	-	-	78	160/100	24	-	-
15	Dharma	70	M	09.07.09	+	+	+	+	+	-	-	4 hrs	-	+	-	-	+	-	-	108	140/90	30	-	-
16	Shanthakumar	73	F	15.07.09	+	-	+	+	+	-	-	16 hrs	-	+	-	-	-	-	-	90	160/100	20	-	-
17	Ekambaram	67	M	21.07.09	+	+	-	+	-	-	-	4 hrs	-	-	-	-	-	-	-	118	130/80	24	-	+
18	Ramamoorthy	65	M	21.07.09	+	+	-	-	-	-	-	8 hrs	+	-	-	-	+	+	-	80	110/80	14	-	-
19	Ramasamy	82	M	23.07.09	+	+	-	-	-	-	-	2 days	-	-	-	-	+	-	-	68	130/80	18	-	-
20	Natarajan	75	M	26.07.09	+	+	-	-	-	-	-	4 days	-	-	-	-	+	-	-	60	90/60	18	-	-
21	Mangalalakshmi	80	F	01.08.09	+	+	+	+	-	+	-	8 hrs	-	-	-	-	-	-	-	124	130/80	20	-	+
22	Mariyam Beevi	70	F	03.08.09	+	+	-	+	-	-	-	4 hrs	-	-	-	-	-	-	-	60	100/60	20	-	-

S.No.	CREPS	KILLIP	ECG	THROMBOLYSIS	HYPOTENSION	CCF	SHOCK	ARRYTHMIAS	LVEF	DEATH
1	-	I	AWMI	+	-	-	-	-	45%	-
2	+	II	AWMI	+	-	-	-	RBBB	40%	-
3	+	IV	AWMI	-	+	+	+	VT	-	+
4	-	I	ASMI	+	-	-	-	-	45%	-
5	-	I	ASMI	+	-	-	-	-	50%	-
6	+	IV	IW/PW/RVMI	-	+	+	+	VT/VF	-	+
7	-	I	IWMI/PWMI	+	-	-	-	-	50%	-
8	-	I	ASMI	-	-	-	-	Bifasicular Block	40%	-
9	+	II	ASMI	+	-	+	-	-	40%	-
10	-	I	IWMI	+	-	-	-	-	50%	-
11	-	I	IWMI	+	-	-	-	AF	55%	-
12	+	III	AWMI	+	-	+	-	VPB	35%	-
13	+	IV	ASMI	-	+	+	+	-	-	+
14	-	I	IWMI/PWMI	+	-	-	-	1° AV BLOCK	45%	-
15	+	II	AWMI	+	+	+	+	VF	-	+
16	-	I	ASMI	-	-	-	-	RBBB + LAFB	40%	-
17	-	III	AWMI	+	-	+	-	-	35%	-
18	-	I	IWMI	+	-	-	-	RBBB	45%	-
19	-	I	IWMI	-	-	-	-	RBBB	45%	-
20	+	II	IWMI/RVMI	-	+	-	-	VF	-	+
21	+	II	AWMI	+	+	+	+	VF	-	+
22	+	II	IW/PWMI	+	-	-	-	RBBB/SINUS BRADYCARDIA	45%	-

23	Sivanathan	70	M	04.08.09	+	-	+	-	-	-	-	2 hrs	-	-	-	-	-	-	-	68	130/80	21	-	-
24	Rajendrababu	68	M	08.08.09	+	+	-	-	-	-	-	2 hrs	-	-	-	-	+	+	-	72	130/80	18	-	-
25	Antony	73	M	10.08.09	+	+	+	+	-	-	-	4 hrs	-	-	-	-	+	+	-	90	100/70	20	-	-
26	Muniammal	67	F	11.08.09	+	+	-	+	-	+	+	8 hrs	-	-	-	-	-	-	-	34	90/70	26	-	-
27	Thirumurugan	80	M	18.08.09	+	-	+	+	-	-	-	3 days	-	-	-	-	+	+	COPD	76	140/90	28	-	-
28	Swaminathan	65	M	21.08.09	+	-	+	+	+	-	-	8 hrs	+	+	-	+	-	-	-	98	110/80	30	+	+
29	Saleem	68	M	29.08.09	+	-	+	+	-	-	-	2 hrs	-	-	-	-	+	+	-	88	150/90	26	-	-
30	Thangaiah	68	M	01.09.09	+	+	+	+	-	-	-	10 hrs	+	-	-	-	-	-	-	90	130/80	16	-	-
31	Rajammal	70	F	02.09.09	+	+	-	-	-	+	-	8 hrs	-	-	-	-	-	-	-	68	110/80	18	-	-
32	Kasi	65	M	03.09.09	+	+	-	-	-		-	4 hrs	+	+	-	-	+	+	CVA	70	120/80	16	-	-
33	Saraswathy	75	F	05.09.09	+	-	-	+	-	+	-	10 hrs	+	+	-	+	-	-	-	80	130/80	20	-	-
34	Kesavan	76	M	07.09.09	+	+	+	+	+	-	-	6 hrs	-	-	-	-	+	+	-	110	110/70	24	+	-
35	Mehreinsha	65	F	07.09.09	+		+	+	+	-	-	12 hrs	-	-	-	-	-	-	-	98	100/70	18	-	-
36	Chellammal	65	F	07.09.09	+	+	-	-	-	+	-	4 hrs	-	-	-	-	-	-	-	104	110/70	14	-	-
37	Lakshmi	74	F	10.09.09	-	-	+	+	+	-	-	2 hrs	-	-	-	-	-	-	RHD	118	130/100	30	+	+
38	Valliammal	80	F	11.09.09	-	-	+	+	+	-	-	1 hr	-	-	-	-	-	-	-	70	80/60	40	+	+
39	Munusamy	70	M	13.09.09	+	+	-	-	-	-	-	6 hrs	+	-	-	-	+	+	-	80	130/80	14	-	-
40	Selvam	84	M	19.09.09	+	-	+	-	-	-	-	8 hrs	-	-	-	-	-	-	-	60	130/80	16	-	-
41	Masanam	65	F	22.09.09	+	-	+	+	-	-	-	16 hrs	-	-	-	-	-	-	-	98	110/70	16	-	-
42	Nallammal	75	F	24.09.09	+	-	-	+	+	-	-	24 hrs	+	+	-	-	-	-	-	110	108/80	18	-	-
43	Angammal	75	F	25.09.09	-	-	-	+	+	-	+	6 hrs	-	-	-	-	-	-	-	116	90/60	32	+	+
44	Muthusamy	72	M	02.10.09	+	+	-	-	-	-	-	8 hrs	+	+	-	-	+	-	-	70	110/70	14	-	-
45	Babu	65	M	03.10.09	+	+	-	-	-	-	-	4 hrs	+	+	-	-	-	-	CKD	62	100/70	16	-	-

23	-	I	IWMI	+	-	-	-	-	50%	-

24	-	I	ASMI	+	-	-	-	-	45%	-
25	-	I	IW/PWMI	+	-	-	-	VT	46%	-
26	+	II	IW/PWMI	+	-	-	-	HIGH GRADE AV BLOCK	40%	-
27	+	II	AWMI	-	-	+	-	RBBB	30%	-
28	+	II	AWMI + IWMI	+	-	+	-	VT/VF	-	+
29	+	II	AWMI	+	-	-	-	-	55%	-
30	-	I	ASMI	+	-	-	-	RBBB/VPB	40%	-
31	-	I	IWMI/RVMI	+	-	-	-	-	50%	-
32	-	I	IWMI/FWMI	+	-	-	-	RBBB	45%	-
33	-	I	IWMI	+	-	-	-	-	50%	-
34	+	III	ASMI	+	+	+	+	-	-	+
35	+	II	ASMI	+	-	+	-	VPB	40%	-
36	-	I	ALMI	+	-	-	-	-	45%	-
37	+	III	ASMI	+	-	-	-	RESISTANT VF	-	+
38	+	IV	AWMI	-	+	+	+	CRBBB	-	+
39	-	I	ASMI	-	-	-	-	Bifasicular Block	40%	-

40	-	I	IWMI/RVMI	+	-	-	-	1° AV BLOCK	50%	-
41	-	I	ASMI	-	-	-	-	COMPLETE HEART BLOCK	35%	-
42	-	I	ASMI	-	-	-	-	-	40%	-
43	+	IV	AWMI	-	+	+	+	-	-	+
44	-	I	IWMI/RVMI	+	-	-	-	RBBB	50%	-
45	-	I	IWMI/RVMI	+	-	-	-	RBBB	46%	-
46	-	I	IWMI	+	-	-	-	-	50%	-
47	+	III	AWMI	-	-	+	-	VPB	30%	-

48	Jagadhambal	80	F	15.10.09	+	+	-	-	+	-	-	6 hrs	-	-	-	-	-	-	-	110	110/80	14	-	-
49	Jeyalakshmi	70	F	17.10.09	+	-	-	+	-	-	-	8 hrs	-	-	-	-	-	-	-	68	110/80	24	+	-
50	Andal	70	F	20.10.09	+	+	-	-	-	-	-	16 hrs	-	-	-	-	-	-	-	98	130/70	14	-	-
51	Natarajan	72	M	24.10.09	+	+	-	-	-	+	+	24 hrs	+	+	-	-	-	-	-	60	100/70	14	-	-
52	Sundarammal	75	F	26.10.09	+	-	-	+	-	-	-	6 hrs	-	-	-	-	-	-	-	68	130/80	16	-	-
53	Poongavanam	84	F	27.10.09	+	+	+	-	-	+	-	8 hrs	-	-	-	-	-	-	-	70	110/80	18	-	-

54	Kathammal	85	F	31.10.09	-	-	-	+	+	-	-	12 hrs	-	+	-	-	-	-	-	110	130/80	20	+	+
55	Chellammal	67	F	01.11.09	+	+	+	-	-	-	-	6 hrs	+	+	-	-	-	-	-	100	120/80	22	-	-
56	Begambevi	78	F	04.11.09	+	+	-	-	-	+	-	14 hrs	-	-	-	-	-	-	-	80	130/80	14	-	-
57	Ismail	67	M	07.11.09	+	+	-	-	-	-	-	8 hrs	-	-	-	-	+	+	-	96	140/80	18	-	-
58	Rajasekar	75	M	11.11.09	-	-	-	+	+	-	-	14 hrs	-	-	-	-	+	-	-	116	100/70	40	+	+
59	Kamakshi	65	F	12.11.09	+	+	+	-	+	-	-	2 days	-	-	-	-	-	-	-	64	110/80	28	-	-
60	Killiammal	80	F	13.11.09	+	+	-	-	-	-	-	24 hrs	-	+	-	-	-	-	-	82	140/90	18	-	-

4	-	I	ASMI	-	-	-	-	-	40%	-

8										
49	+	II	IW/RV/PWMI	+	-	-	-	COMPLETE HEART BLOCK	45%	-
50	-	I	ASMI	-	-	-	-	-	40%	-
51	-	I	IWMI	-	+	-	-	1° AV BLOCK	45%	-
52	-	I	IWMI	+	-	-	-	RBBB	50%	-
53	-	I	IWMI/RVMI	+	+	+	+	-	-	+
54	+	III	AWMI	-	+	+	+	-	-	+
55	+	II	AWMI	+	-	-	-	-	40%	-
56	-	I	ASMI	-	-	-	-	-	40%	-
57	-	I	ASMI	+	-	+	-	VF	-	+
58	+	IV	AWMI	-	+	+	+	-	-	+
59	-	I	IWMI	-	-	-	-	-	45%	-
60	-	I	ASMI	-	-	-	-	VPB	35%	-

ABBREVIATIONS

ACE	:	Angiotensin Converting Enzyme
ACS	:	Acute Coronary Syndrome
AMI	:	Acute Myocardial Infarction
ASMI	:	Antero Septal Myocardial Infarction
AWMI	:	Anterior Wall Myocardial Infarction
ALMI	:	Antero Lateral Myocardial Infarction
AV Block	:	Atrioventricular Block
BHAT	:	Beta Blocker Heart Attack
BP	:	Blood Pressure
CAD	:	Coronary Artery Disease
CASS	:	Coronary Artery Surgery Study
CHB	:	Complete Heart Block
CK	:	Creatine Kinase
CURE study	:	Clopidogrel in Unstable Angina to prevent Recurrent ischemic Events study
ECG	:	Electrocardiogram
ECHO	:	Echocardiogram
FT	:	Fibrinolytic Therapy
GUSTO Trial	:	Global Utilisation of Streptokinase and Tissue Plasminogen activator for occluded Coronary Arteries trial
HDL	:	High Density Lipoprotein
HMG CoA	:	Hydroxy Methylglutaryl Coenzyme A

IWMI	:	Inferior Wall Myocardial
JVP	:	Jugular Venous Pulse
LAFB	:	Left Anterior Fascicular Block
LBBB	:	Left Bundle Branch Block
LV	:	Left Ventricle
LVEF	:	Left Ventricular Ejection Fraction
MI	:	Myocardial Infarction
MILIS	:	Multicenter Investigation of the Limitation of Infarct size
NSTEMI	:	Non ST Elevation Myocardial Infarction
RBBB	:	Right Bundle Branch Block
RHD	:	Rheumatic Heart Disease
SK	:	Strepto Kinase
SAVE	:	Survival and Ventricular Enlargement
STEMI	:	ST Elevation Myocardial Infarction
TIMI	:	Thrombolysis in Myocardial Infarction
t-PA	:	tissue Plasminogen Activator
UA	:	Unstable Angina
VPB	:	Ventricular Premature Beat
VT	:	Ventricular Tachycardia
VF	:	Ventricular Fibrillation